

CLAIMS

We claim:

1 1. A substrate holder (1), in particular for a facility for epitaxial deposition of
2 semiconductor material (3) on a substrate (2), having a substrate supporting face and a
3 holder rear face, which faces away from this supporting face,

4 wherein

5 the substrate holder (1) has a temperature equalization structure which results in
6 a defined temperature profile over the entire substrate surface of a substrate (2) which
7 is located on or in the vicinity of the substrate holder (1), during a process which
8 includes heating or cooling.

1 2. The substrate holder as claimed in claim 1, in which the temperature
2 equalization structure results in an as uniform as possible temperature over the entire
3 substrate surface.

1 3. The substrate holder as claimed in claim 1, in which the temperature
2 equalization structure is one or more three-dimensional structures in the substrate
3 supporting face and/or in the holder rear face.

1 4. The substrate holder as claimed in claim 3, in which the three-dimensional
2 structures are formed by at least one groove (4) which runs in the vicinity of the edge.

1 5. The substrate holder as claimed in claim 4, in which the width of the
2 groove or grooves (4) is at most 80% of the radius of the substrate holder, and the
3 depth of the groove or grooves (4) is less than the thickness of the substrate holder (1)
4 or of a coating which is located on the substrate supporting face.

1 6. The substrate holder as claimed in claim 4, in which the groove or grooves
2 (4) is or are arranged in an annular shape and concentrically.

1 7. The substrate holder as claimed in claim 4, in which the distance between
2 the grooves (4) in areas in which relatively high temperatures occur during or after the
3 mentioned process, in particular during the growth of semiconductor material, is less
4 than in the areas in which temperatures which are lower than these occur.

1 8. The substrate holder as claimed in claim 4, in which the depth of the
2 grooves (4) is greater in areas in which relatively high temperatures occur during the
3 growth of the semiconductor material than in areas in which temperatures which are
4 lower than these occur.

1 9. The substrate holder as claimed in claim 4, in which the groove or grooves
2 (4) has or have a quadrilateral, circular or oval cross section, or a cross section with a
3 segment of one of these shapes.

1 10. The substrate holder as claimed in claim 1, in which the temperature
2 equalization structure comprises texturing.

1 11. The substrate holder as claimed in claim 10, in which the texturing
2 includes two or more trenches and/or pits, the distance between which is matched to
3 the temperature profile of the substrate holder (1), in such a way that the distance
4 between trenches and/or pits in areas in which relatively high temperatures occur during
5 the growth of the semiconductor material is less than in areas in which temperatures
6 which are lower than these occur.

1 12. The substrate holder as claimed in claim 10, in which the texturing
2 includes two or more trenches and/or pits, whose depth is matched to the temperature
3 profile of the substrate holder (1) such that the trenches and/or pits are deeper in areas
4 in which relatively high temperatures occur during the growth of semiconductor material
5 than in areas in which temperatures which are lower than these occur.

1 13. The substrate holder as claimed in claim 10, in which the texturing
2 includes
3 - trenches wherein at least some of these cross one another,
4 - trenches wherein at least some of these are arranged parallel to one
5 another,

6 - trenches where at least some of these are curved,
7 - pits which are in the form of dots, circles or cuboids,
8 - pits which have a combination of dotted, circular and/or cuboid shapes, or
9 - trenches and/or pits which have a combination of at least two of the
10 shapes mentioned above.

1 14. The substrate holder as claimed in claim 1, in which the temperature
2 equalization structure comprises two or more circulating steps of different depths.

1 15. The substrate holder as claimed in claim 14, in which the steps are
2 arranged concentrically and centrally.

1 16. The substrate holder as claimed in claim 14, in which the surface which is
2 provided with steps has a continuously stepped relief.

1 17. The substrate holder as claimed in claim 14, in which the depth of the
2 steps is matched to the temperature profile of the substrate holder (1), such that the
3 depth of the steps is greater in areas in which relatively high temperatures occur during
4 the growth of semiconductor material than in areas in which temperatures which are
5 lower than these occur.

1 18. The substrate holder as claimed in claim 1, in which the substrate
2 supporting face has a substrate support structure, by means of which, when the
3 substrate is supported, a gap (8) is formed between the substrate (2) and the substrate
4 holder.

1 19. The substrate holder as claimed in claim 18, in which the substrate
2 support structure is designed such that essentially only the edge or those areas of the
3 substrate (2) which are on the edge are supported, and the substrate (2) essentially
4 makes no contact with the substrate holder (1) anywhere else.

1 20. The substrate holder as claimed in claim 18, in which the substrate
2 support structure has a step which surrounds the substrate.

1 21. The substrate holder as claimed in claim 18, in which the substrate
2 support structure comprises at least one substrate stop for holding the substrate (2),
3 wherein the substrate stop has a substrate support surface (9) above the substrate
4 holder surface.

1 22. The substrate holder as claimed in claim 21, in which the substrate stop is
2 formed by means of a hemisphere or a platform (6) with an incision (7), which has at
3 least one substrate support surface (9) parallel to and above the substrate holder
4 surface.

1 23. The substrate holder as claimed in claim 1, in which a recess is provided
2 on the substrate supporting face of the substrate holder (1) and is at least sufficiently
3 large that the substrate (2) can at least partially be arranged in the recess, parallel to
4 the support surface of the substrate holder (1).

1 24. The substrate holder as claimed in claim 1, in which the surface of the
2 substrate holder has a roughness of less than 10 μm .

1 25. The substrate holder as claimed in claim 1, in which the substrate holder
2 (1) has a ground and/or polished surface.

1 26. A facility for epitaxial deposition of a semiconductor material (3) on a
2 substrate (2) having at least one reactor, one gas mixing system and one exhaust gas
3 system, with the reactor having at least one substrate holder (1), a mount for the
4 substrate holder (1) and a means for heating,

5 wherein

6 the substrate holder (1) is designed as claimed in claim 1.